

**CLAIMS**

What is claimed is:

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a1* > 1. A reusable master chain link for a derailleur chain, comprising:
- first and second pins positioned substantially parallel to one another, said first pin having first and second heads at opposite ends thereof and said second pin having first and second heads at opposite ends thereof; and
- first and second elongated plates positioned substantially parallel to one another, said first and second pins extending between said first and second plates, said first and second plates having respective first and second apertures formed therein, said first and second apertures having respective narrow curvilinear portions narrower than said respective first heads of said first and second pins to prevent said respective first heads from passing therethrough, said narrow curvilinear portions having respective countersinks formed therearound for receiving and substantially concealing said respective first heads of said first and second pins, said first and second apertures having respective wide curvilinear portions wider than said respective first heads of said first and second pins to permit said respective first heads to pass therethrough to disassemble the chain link, said respective wide curvilinear portions being connected to said respective narrow curvilinear portions to permit movement of said respective first heads therebetween, said

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respective second heads of said first and second pins being connected to said respective second and first plates.

2. The chain link of claim 1, wherein said first and second apertures include respective elongated slots coupled between said respective narrow curvilinear portions and said respective wide curvilinear portions to permit  
5 movement of said respective first heads between said respective wide and narrow curvilinear portions via said respective elongated slots.

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a23* 3. The chain link of claim 1, wherein said respective second heads of said first and second pins are integrally connected to said respective second and first plates with said respective second heads flush with the outer surfaces  
5 of said respective second and first plates.

4. The chain link of claim 3, wherein said respective second heads of said first and second pins are laser welded to said respective second and first plates with said respective second heads flush with the outer surfaces of  
5 said respective second and first plates.

5. The chain link of claim 1, wherein said countersinks surround more than half the peripheries of said respective first heads to positively position said first heads in said respective countersinks.

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1 *Sub a3* 6. The chain link of claim 1, wherein each of said first and second plates extend longitudinally between first and second ends, said first end of said first plate having an extension connected thereto to prevent movement of one of  
5 said first heads from its associated narrow curvilinear portion to its associated wide curvilinear portion without rotating the chain link approximately orthogonal to an adjacent interconnected chain link.

7. The chain link of claim 6, wherein said first end of said second plate includes an extension connected thereto.

*Sub a4* 8. A reusable master chain link for a derailleur chain, comprising:

first and second pins positioned substantially parallel to one another, said first pin having first and  
5 second heads at opposite ends thereof and said second pin having first and second heads at opposite ends thereof; and

first and second elongated plates positioned substantially parallel to one another, each of said first and second plates extending longitudinally between first  
10 and second ends, said first and second pins extending between said first and second plates, said first and second plates having respective first and second apertures formed therein for receiving said first heads of said respective first and second pins, said first and second apertures  
15 having respective narrow curvilinear portions narrower than said respective first heads of said first and second pins

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to prevent said respective first heads from passing therethrough, said first and second apertures having respective wide curvilinear portions wider than said  
20 respective first heads of said first and second pins to permit said respective first heads to pass therethrough to disassemble the chain link, said respective wide curvilinear portions being connected to said respective narrow curvilinear portions to permit movement of said  
25 respective first heads therebetween, said first end of said first plate having an extension connected thereto to prevent movement of one of said first heads from its associated narrow curvilinear portion to its associated wide curvilinear portion without rotating the chain link  
30 approximately orthogonal to an adjacent interconnected chain link, said respective second heads of said first and second pins being connected to said respective second and first plates.

9. The chain link of claim 8, wherein said first and second apertures include respective elongated slots coupled between said respective narrow curvilinear portions and said respective wide curvilinear portions to permit  
5 movement of said respective first heads between said respective wide and narrow curvilinear portions via said respective elongated slots.

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a5>10. The chain link of claim 8, wherein said respective second heads of said first and second pins are integrally

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connected to said respective second and first plates with  
said respective second heads flush with the outer surfaces  
5 of said respective second and first plates.

11. The chain link of claim 10, wherein said respective  
second heads of said first and second pins are laser welded  
to said respective second and first plates with said  
respective second heads flush with the outer surfaces of  
5 said respective second and first plates.

12. The chain link of claim 9, wherein said narrow  
curvilinear portions having respective countersinks formed  
therearound for receiving and substantially concealing said  
respective first heads of said first and second pins.

13. The chain link of claim 8, wherein said first end of  
said second plate includes an extension connected thereto.

*Sub*  
*ab* 14. A chain assembly for a derailleur chain, comprising:  
a master chain link including first and second  
parallel pins, said first pin having first and second heads  
at opposite ends thereof and said second pin having first  
5 and second heads at opposite ends thereof, said master  
chain link further including first and second parallel  
elongated plates, said first and second pins extending  
between said first and second plates, said first and second  
plates having respective first and second apertures formed  
10 therein for receiving said respective first heads of said

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first and second pins, said first and second apertures having respective narrow curvilinear portions narrower than said respective first heads of said first and second pins, said first and second apertures having respective wide  
15 curvilinear portions wider than said respective first heads of said first and second pins, said respective wide curvilinear portions being coupled to said respective narrow curvilinear portions, said respective second heads of said first and second pins being connected to said  
20 respective second and first plates; and

a roller chain link including a pair of parallel elongated plates with first and second ends and a pair of hollow cylinders connected between said plates, each of said plates of said roller link having a respective pair of  
25 apertures opening into said respective hollow cylinders, one of said pins of said master link interconnecting with one of said hollow cylinders at said first ends of said respective plates of said roller link, said first end of one of said plates of said roller link having an extension  
30 connected thereto to prevent movement of said first heads of said master link from their associated narrow curvilinear portions to their associated wide curvilinear portions without rotating said master link approximately orthogonal to said roller link.

15. A chain assembly for a derailleur chain, comprising:

a master chain link including first and second parallel pins, said first pin having first and second heads

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at opposite ends thereof and said second pin having first  
5 and second heads at opposite ends thereof, said master  
chain link further including first and second parallel  
elongated plates, said first and second pins extending  
between said first and second plates, said first and second  
plates having respective first and second apertures formed  
10 therein for receiving said first heads of said respective  
first and second pins, said first and second apertures  
having respective narrow curvilinear portions narrower than  
said respective first heads of said first and second pins,  
said first and second apertures having respective wide  
15 curvilinear portions wider than said respective first heads  
of said first and second pins, said respective wide  
curvilinear portions being coupled to said respective  
narrow curvilinear portions, said respective second heads  
of said first and second pins being connected to said  
20 respective second and first plates;

an outer pin link including first and second parallel  
elongated plates and a pair of parallel pins connected  
therebetween, each of said plates of said outer pin link  
having first and second ends; and

25 a roller link interconnecting said master link and  
said outer pin link such that said first and second plates  
of said outer pin link are laterally aligned with said  
respective first and second plates of said master link with  
said first end of said first plate of said outer pin link  
30 positioned adjacent said first aperture of said first plate  
of said master link, said first end of said first plate of

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said outer pin link having an extension connected thereto to prevent movement of said first heads of said master link from their associated narrow curvilinear portions to their associated wide curvilinear portions without rotating said master link approximately orthogonal to said outer pin link.

16. An assembly for engagement with a substantially identical assembly to form a reusable master chain link for a derailleur chain, comprising:

a pin having first and second heads at opposite ends thereof, said first head being substantially identical to a third head of the substantially identical assembly; and

an elongated plate connected to said second head of said pin, said plate having an aperture formed therein adapted to engage the third head, said aperture having a narrow curvilinear portion narrower than the third head to prevent the third head from passing therethrough, said narrow curvilinear portion having a countersink formed therearound for receiving and substantially concealing the third head, said aperture having a wide curvilinear portion wider than the third head to permit the third head to pass therethrough, said wide curvilinear portion being connected to said narrow curvilinear portion to permit movement of ~~the third head therebetween~~

17. The assembly of claim 16, wherein said aperture includes an elongated slot coupled between said narrow



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curvilinear portion and said wide curvilinear portions to  
permit movement of the third head between said wide and  
5 narrow curvilinear portions via said elongated slot.

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a9* 18. The assembly of claim 16, wherein said second head of  
said pin is laser welded to said plate with said second  
head flush with the outer surface of said plate.

19. The chain link of claim 16, wherein said countersink  
surrounds more than half the periphery of said first head  
to positively position said first head in said countersink.